

Interactive comment on “Statistical analysis and modelling of surface runoff from arable fields” by P. Fiener et al.

Anonymous Referee #3

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Surface runoff generation on arable land is the most important driver of flooding, onsite and offsite erosion, and of nutrient and agrochemical transport in Europe, America, Africa, especially in Asia. So their work could be very helpful to understand the surface runoff generation processes in arable land and what the influencing factors are.

The manuscript reported his results that, in their field experiments, the initial abstraction and the hydrograph were best described by six of properties or variables. In the study area and the field experiments, stone cover was most important for the initial abstraction and time since tillage for the hydrograph. Perhaps that is all the manuscript could tell reader. Some comments and suggestions as following:

It is not necessary to overemphasize the results and to compare with the mechanistic

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models. (If I am not correct, the introduction is too insufficient to understand the background of the topic.) The analysis result in the manuscript was obtained in the specific area and the specific arable land with stone cover. It is a specific condition, not necessarily in the arable land of other places. As the manuscript mentioned, stone cover and stone content in soil profile could influence the initial abstraction by increasing soil porosity. So in other places without stone cover or stone content in arable land, the important variable is still soil properties, or some variables which could lead to the better or bad soil hydraulic conductivity play the role like stone cove here. Another important variable in the manuscript is the time since tillage. Just as discussed in the paper, when it is the short-term, it is soil property itself or soil crust to influence infiltration and surface runoff generation, when it is longer term, it is vegetation cover and biopores to affect runoff generation. In the field experiments of the paper, the time since tillage as a variable was recorded, but not necessarily in other arable land. So the results obtained by the experiments were probably just confined to the specific places. From this view, the results were overemphasized, and the title of the manuscript could be changed to “Statistical analysis and modeling of surface runoff form arable fields in Central Europe”.

The authors tried to understand the surface runoff generation processes in the arable land using three mechanisms. But the results showed that both Horton type equations and Green-Ampt type equations fitted the data well, and at last the statistical empirical model was also obtained to greatly explain the data. In the manuscript, the variables regarded important in the model was frequently compared to these mechanistic equations, but failed to tell what on earth the similarity and the differences are in the variables of two kinds of models. From the view of reader, although the lumped hydrological model (SCS-CN) and Horton, Green and Ampt or Philips equations didn't consider the variable of “TsT” to address infiltration, other variables they considered could stand for “TsT” or even better than “TsT” for “TsT” not necessarily used in the hypothesis or in other places.

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It would be helpful to understand the results in the paper if more detail information be described about the arable land and the habit of agricultural activities in the study area, for example, why the arable land was covered by stone in agricultural operation there?

It is hard to understand the description of “Stone cover was most important for the initial abstraction. . .” in the abstract and “The RMSE was rather large (and R2 low) indicating that initial abstraction was strongly influenced by factors that could not be captured by the available variables.” in P3672-3673. It is contradictive? What is the extent of “most important” and what is the extent of “strongly influenced ”?

P3675 L23-25 “Consequently, stone cover can be neglected for many soils because the average stone cover in our data set was 6.6 %.” Why stone cover was still declared to be most important to initial abstraction in the paper without any conditional explanation?

1. Does the paper address relevant scientific questions within the scope of HESS? yes
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 14. Are the number and quality of references appropriate? Yes
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